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# Small Farms Research Update

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Fall 2003

## Sheep and Goat Field Update

### Overview

On September 20, 2003 the Dale Bumpers Small Farms Research Center (DBSFRC) in conjunction with Arkansas Cooperative Extension Service (ACES) held a Sheep and Goat Field Day. The field day was held at the South Logan County Fairgrounds, just south of Booneville. About 200 people attended (approximately 130 adults, 27 children and 20 employees of either DBSFRC or ACES), with at least 5 states represented. The morning program consisted of an overview of sheep research at DBSFRC by Dr. Burke, followed by a safe drenching workshop by Drs. Miller and Olcott of Louisiana State University. Also in the morning, Jodie Pennington and others from ACES conducted a youth program on the showmanship, selection, fitting, and showing of sheep. Lamb burgers and goat chili was served for lunch. The afternoon program consisted of presentations regarding sustainable farming by Billy Moore and Jodie Pennington of ACES, Oklahoma Buck (Goat) Testing program by Dr. Gipson of Langston University, and production for optimal meat quality by Dr. Apple of University of Arkansas. These talks were followed by either a panel discussion regarding value added products or FAMACHA training for managing Barberpole worm. The late afternoon was open for discussion, a review of animals, and demonstration of typical techniques used in sheep production like docking, etc. The field day would not have been possible without the help from the Booneville community in general, and specifically the following organizations and individuals: Booneville Industrial Development Corporation, Booneville Chamber of Commerce, University of Arkansas-Fayetteville, Animal

Science Department, Jack Black, Booneville School District and South Logan County Fair Board. Thanks to all who help make the Field Day a successful one.

The rest of this update is a report of the information from the Sheep and Goat Field Day. These summaries are written from my notes during the presentations. Efforts are under way to have the actual presentations available on the Internet. We will provide that information as it becomes available.

### Hair Sheep Research at DBSFRC

by Joan Burke

Dr. Burke's presentation focused on three areas of research: 1) Hair sheep performance under an accelerated lambing scheme as compared to annual lambing; 2) Use of the Dorper breed to enhance performance and acceptability of hair sheep lambs; and, 3) internal parasite management. Under accelerated lambing schedule, fall-born lambs tended to be smaller, number of lambs/pregnancy were less, and conception rates for fall born lambs were lower. These differences tended to be larger with Dorper ewes compared to Katadhin. Dorper lambs and ewes tend to have greater fecal egg counts than other hair breeds. At a 90 pound finishing weight, Dorper lambs had greater loin eye area, even greater than Suffolk lambs. Future research using Dorsers is going to focus on the use of Dorper rams as a terminal sire to impart better carcass qualities on hair sheep lambs because of the observed sensitivity of Dorper ewes and lambs to internal parasites. In addition to examining breed



differences regarding parasite tolerance, the use of tannin rich forages and copper wire boluses are being examined as means of controlling internal parasites. Preliminary results with both tannin rich forages and the copper wire bolus are encouraging.

## Internal Parasite Management

by James Miller, Louisiana State University

Sheep and goat producers, especially in the southeast United States, are threatened by increasing resistance of internal parasites, and worms, to currently available deworming drugs. Also, it is unlikely that new dewormers will be available in the foreseeable future. It is estimated that at least \$200 million is required to bring a new dewormer to market. Most of agri-chemical companies appear unwilling in today's market to incur such an expense for the development of new dewormers. Therefore, sheep and goat producers need to use management practices that extend the usefulness of existing dewormers.

There are 4 species of worms that can cause problems for small ruminants: *Oesophagostomum*, *Trichostrongylus*, *Teladorsagia circumcincta* and *Haemonchus contortus*. *Oesophagostomum*, or large mouth, infests the large intestine but is not a large problem in the U.S. *T. colubriformis*, or bankrupt worm, infests the small intestine and can produce devastating outbreaks locally. *Teladorsagia circumcincta* can be a problem in the northern and western U.S.

*Haemonchus contortus*, or Barberpole worm, is the biggest problem facing sheep and goat producers. This worm infests the abomasums and is a blood-sucking parasite. Because the parasite's regeneration is temperature dependent, most severe infestations occur in the summer or early fall. The name Barberpole worm comes from its appearance- red and white swirls like an old fashion barber's pole. Animals that have succumbed to this parasite will have 1-inch worms readily apparent on the abomasum stomach lining. This parasite mainly affects sheep and goats. Because these worms suck blood, infested animals become anemic and may develop bottle jaw (a type of double chin).

The worm has a fairly simple life cycle. Eggs in feces are distributed to the soils. The eggs hatch in the soil and develop into larvae. The larvae will travel up dewy grass so that they are about 2 inches above the soil. A grazing animal can then readily ingest the larvae thus becoming infested. The worms take about 21 to 28 days to mature in sheep, thus repeating the sequence. The worm thrives in warm, moist climates, conditions typical of the southeast U.S.

Goats are particularly vulnerable to the Barberpole worm. Goats originated in arid climates and are natural browsers, preferring to eat forage that is at least 5 to 6 inches above the ground. Therefore goats have not been exposed to this parasite until recently, and therefore have developed little if any resistance.

Why are parasites developing resistance to dewormers? Simply we have overused and have become overly dependent on dewormers. Parasites being survivors have thus developed immunity. Although goat and sheep producers are currently the ones experiencing problems associated with dewormer resistant parasites, other livestock industries, in particular, the horse industry, are beginning to experience the problem or will in the near future. To be considered effective, a dewormer must be able to reduce the parasite load in an infested animal by 95%.

Four specific factors have contributed to the development of dewormer resistant parasites: 1) Frequent treatment intervals; 2) Treatment of all animals at the same time; 3) Moving treated animals to new pastures/paddocks (eggs of resistance worms are then deposited in a field where they do not have to compete with dewormer susceptible worms); and 4) Use of under doses. Continuing these four practices will inevitably lead to drug resistant parasites.

Producers need to manage parasites in a fashion that dewormer sensitive parasites are maintained in the population to keep the currently available dewormers effective. Said another way, today's management practices must consider future needs and consequences.

The available types or classes of anthelmintics were briefly described by Dr. Miller and then later



in depth by Dr. Olcott. A review of these anthelmintics is summarized in the next article.

The concept behind SMART Drenching is to use the existing anthelmintics as effective as possible while minimizing the development of dewormer resistant parasites.

First, use the correct dose. Know the weight of the animal. Anthelmintics need to be administered at the back of the mouth to ensure that the drug is not shunted past the rumen. Sheep and goats poorly utilize pour-on products, unless they are used as a drench.

Second, restrict feed intake by the sheep or goats for 12 to 24 hours prior to anthelmintic treatment.

Third, producers should consider combining drugs between classes of anthelmintics.

Fourth, producers should use one type of anthelmintics for a whole season.

Five, producers should not pay for resistant worms. New animals should be quarantined for a minimum of 48 hours but preferably 10 to 14 days. During this time they should be dewormed. If fecal eggs counts remain high after initial treatment, moxidectin type anthelmintics should be used.

Six, producers should manage their fields and paddocks to minimize larva development.

Worms/larva can persist in the soil for a year under certain conditions. The removal of grass by whatever means can significantly reduce future worm problems.

Seven, producer should only treat infested animals.

The FAMACHA procedure is a means that was developed to treat infested animals and will be described in detail in the next paragraph.

Existing data indicate that a minority of the animals in a flock or herd will have a majority of the worms. Typically 20 to 30% of the goats will have two-thirds of the worms. Therefore, a protocol is needed to determine which individuals in a group need anthelmintic treatment.

FAMACHA is such a protocol. As stated earlier, the Barberpole worm is a blood sucker and thus can cause anemia in infested animals. If the Barberpole worm is the only cause of anemia in a flock/herd, then the parasite load of individual animals can be assessed by the presence of anemia by apparent anemia. The color of the second eyelid has been found to be a good indicator of anemia in both sheep and goats.

FAMACHA is essentially a color scheme assigning a score of 1 to 5, dependent on the color of the second eyelid. A score of 1 indicates no signs of anemia whereas a score of 5 indicate the color is very white and the animal is near death. If less than 10% of the individuals in a flock/herd have FAMACHA scores of 4 or 5, then those animals should be treated. If more than 10% of the flock/herd on scores of 4 or 5, then animals with scores of 3, 4 and 5 should be treated and other interventions, like rotating to a new pasture, should be implemented. During the summer months (July through September) eyelid should be examined every 2 to 3 weeks. If the herd/flock's average score is increasing, then eyelid examination may need to occur more frequently. Eyelid examination should occur every 4 to 6 weeks during the remaining months. The following website should provide more information: [famacha@vet.uga.edu](mailto:famacha@vet.uga.edu).

Other approaches for the control of the Barberpole worm are being investigated. These include: 1) the use of a fungi that traps the larva in the feces thus interrupting its life cycle; 2) a vaccine to impart resistance; 3) copper wire boluses; and, 4) the feeding of forages with high amounts of condensed tannins; and pasture management techniques like reduced stocking rates, pasture rotation, or pasture rotation with multi-species ruminants, etc.

## Use of Anthelmintics

by Donya Olcott, Louisiana State University

There are currently only 3 anthelmintics labeled for goats and 4 for sheep. These anthelmintics fall into one of three types: benzimidazoles, macrocyclic lactones and cholinergic inhibitors.

The AMDUCA of 1994 allows producer to use drugs/anthelmintics that are not specifically labeled for such use. Producers can use drugs in "extra-label" way if the following conditions are met: 1) there must be a veterinarian/client relationship guiding the use of anthelmintics for "extra-label" use; 2) use is limited to drugs approved for use in humans or animals in the U.S.; 3) drugs must be used to prevent animal death, not to increase animal productivity; 4) drugs can not be added to feed, i.e., they must be administered by some other manner; and 5) producer must keep records of use of such drugs



for at least 2 years. In general, goats will require higher doses of anthelmintics approved for sheep, approximately 1.5 to 2 times that for sheep.

The following guidelines need to be followed to ensure anthelmintic drenches are as effective as possible. Anthelmintics should be used according to the label, including the storage of such drugs. Animals should be weighed prior to drenching and dose based on that weight. Good equipment should be used. In particular, drenching equipment should facilitate the deposition of the material behind the tongue. Certain drugs like benzimidazoles can be administered twice in 24 hours to increase effectiveness. Effectiveness of drenching can be increased by simultaneously using two products at once. Both products should then be used for the entire season. Withholding feed can increase the effectiveness of anthelmintics fed for about 24 hours before drenching. Animal performance records and animal identification tags can be useful in identifying animals in need of treatment. Moxidectin (Cydectin) should be used sparingly.

### **Small ruminant Check-off sheet**

Just prior to lunch, Linda Coffey from ATTRA/NCAT said that they were seeking volunteers to evaluate a sustainability check sheet. For further information and to participate contact Linda Coffey at ATTRA.

### **Sustainable Farming Tips**

by Billy Moore

Billy Moore summarized his presentation as a common sense approach to sustaining a farming operation. His tips included the following. Sustainable farms have both good management practices and good records. When times are tough, producers should continue to do the things that have made them successful in the past. Management practices that have been successful in the past should be continued. Even in tough times, breeding stock and animals should be maintained at a high level.

### **Advantages and Disadvantages of Meat Goat Production**

by Jodie Pennington

Disadvantages of raising meat goats are: 1) long-term uncertainty about the size of the market and future prices; 2) insufficient knowledge about different breeding stock to select superior individuals; 3) susceptibility to internal parasites; 4) insufficient knowledge among vets to obtain good health care; and, 5) the need for predator control which can increase the cost of fencing. Many of these disadvantages are declining as goat production becomes more common.

Advantages of raising meat goats: 1) the need for minimal facilities, especially compared to cattle production; 2) an ample availability of forages; 3) close access to the market at Somerville, TN; 4) substantial increases in market size in recent years; 5) good prices at present; and 6) utilization of forages and shrubs not utilized by sheep or cattle.

The ACES web site has typical budgets for lamb production, meat goat production and dairy goats. These budgets are especially useful in providing information regarding start-up costs.

### **Oklahoma's Buck Test Program**

by Terry Gipson, Langston University

Dr. Gipson started his presentation by summarizing changes in the meat goat industry in recent years. The number of goats slaughtered at USDA inspected sites has increased from 100,000 in 1980 to almost 500,000 in 2000. There was an additional 20% increase from 2000 to 2002 with almost 600,000 goats slaughtered. In the 1980's and early 1990's, the U.S. was an exporter of goat meat. That situation changed in 1993. Since 1993, the U.S. is an importer of goat meat. It is estimated that about \$14 million worth of goat meat was imported in 2002, mainly from Australia and New Zealand. These statistics tend to indicate that the meat goat industry should see continued increases in the near future.

Two other observations add uncertainty regarding continual growth in the meat goat industry. First, survey results, especially among ethnic buyers, indicate that if the price of goat meat becomes too



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high they will buy substitutes. Second, quality has yet to become a determinant of demand.

Further increases in the meat goat industry could occur through exposure of non-ethnic individuals to the product. The most likely place for such exposure to occur is in restaurants. The current limitation of goat meat products to enter restaurant market is a carcass with a cut for a meal portion. The OK Buck testing program was developed to select bucks with superior carcass characteristic, specifically those suitable for the production of cuts for use in restaurants.

Details of how the tests are conducted and the results from recent tests can be found on the following website:  
[www.luresext.edu/goats/extension/2002bucktest.htm](http://www.luresext.edu/goats/extension/2002bucktest.htm).

## Optimal Meat Quality of Sheep and Goats

by Jason Apple, University of Arkansas-Fayetteville

Dr. Apple summarized a large body of research results regarding factors that influence quality and acceptability of goat and sheep meat. In general, there is little difference between sheep breeds with regard to tenderness, and juiciness; however there may be differences among goat breeds, especially with respect to tenderness. Castration tends to improve the tenderness of both goat and sheep meat. Tenderness tends to decline with increases in age and slaughter weight for both species. Tenderness is directly related to the amount of back fat. However, flavor of sheep tends to increase with back fat whereas flavor intensity tends to decrease with back fat in goats. The meat palatability characteristics of sheep raised on grass were not significantly different from those of sheep fed in a feedlot.

Contact information for speakers:

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## Did you notice?

The name of the "newsletter" has changed from Small Farms Research News to Small Farms Research Update. We recently received a reminder that individual ARS locations are not to produce regular newsletters, that is the job of the Information Staff In Beltsville, MD. Information Staff produces a fine publication, Agricultural Research, summarizing recent accomplishments throughout ARS. Subscription information can be obtained by calling 202-512-2250 or at the website: <http://bookstore.gpo.gov>. However, I believe from comments that I have received that this means of updating stakeholders is important to you all. Therefore, DBSFRC will continue to produce "Updates", 3 to 4 times a year. However, these updates will not adhere to a fix publication schedule.

## Dale Bumpers Small Farms Research Center is a partnership among three institutions:

ARS- conducts research related to livestock production and agroforestry; ARS staff can be reached at 479-675-3834.

PMC/NRCS- evaluation of vegetation and vegetation technology to retain soil and its productive capability; NRCS staff can be reached at 479-675-5182.



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Division of Agriculture / University of Arkansas- dissemination of agricultural information. Extension Specialist, Billy Moore, can be reached at 479-675-5585.

ARS scientists at DBSFRC and their primary research focus:

David Brauer- Agronomist/Research Leader investigating both agroforestry and livestock production

David Burner- Agronomist investigating crop production in agroforestry systems

Joan Burke- Animal Scientist investigating reproductive performance in cattle and production practices for hair sheep

Michael Looper - Animal Scientist investigating beef cattle production.

Dan Pote- Soil Scientist investigating the effects of management practices on sediment and nutrient retention in agroforestry and livestock production systems.

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## Organizations promoting agriculture in the Ozark Region

The information below is not an exhaustive list of organizations trying to help farmers and ranchers in the Ozarks. If your organization is interested in being included, please contact David Brauer.

*Poultry Production and Product Safety Research Unit (PPPSRU)/ARS/USDA/Center of Excellence for Poultry Science* is located on the campus of the University of Arkansas in Fayetteville. PPPSRU conducts research to solve problems related to: 1) diseases and physiological disorders that are of economic important to the poultry industry; and 2) land application of waste from the poultry production. PPPSRU can be reached at 479-575-4202 or on the world wide web at [www.uark.edu/~usdaars/](http://www.uark.edu/~usdaars/).

*South Central Agricultural Research laboratory (SCARL)/ARS/USDA* conducts multi-disciplinary research for developing technologies

to establish and sustain production and post harvest quality of alternative crops such as vegetables, small fruits, and kenaf. The Laboratory is co-located with the Oklahoma State University's Wes Watkins Research and Extension Center in Lane, OK. SCARL can be reached by phone at 580-889-7395 or on the world wide web at [www.lane-ag.org](http://www.lane-ag.org).

*Shirley Community Development Corporation (SCDC)* is a community-based organization formed to plan and initiate short- and long-term development programs for Shirley, AR and the surrounding communities. These programs focus on economic development, educational enhancement, youth job training, and service projects that improve and strengthen the community. SCDC is involved in projects that research and demonstrate the skills and techniques needed for production and marketing of specialty agricultural crops. The present focus is on log-grown Shiitake mushrooms. SCDC operates the Shiitake Mushroom Center as a training center. Recent additions include on-site production of garden bricks and stepping stones, raised bed herbal plots, twin wall polycarbonate greenhouse, and compost demonstration project. SCDC can be reached by phone at (501) 723-4443 or on the web at <http://www.shiitakecenter.com/index.html>.

*The Kerr Center for Sustainable Agriculture* in Poteau, OK offers leadership and educational programs to those interested in making farming and ranching environmentally friendly, socially equitable, and economically viable. The Kerr Center can be reached by phone at 918-647-9123, by email at [mailbox@kerrcenter.com](mailto:mailbox@kerrcenter.com) or on the web at [www.kerrcenter.com](http://www.kerrcenter.com).

*ATTRA, Appropriate Technology Transfer for Rural Areas*, is the national sustainable agriculture information center. ATTRA provides technical assistance to farmers, Extension agents, market gardeners, agricultural researchers, and other ag professionals. ATTRA is located in Fayetteville, AR. ATTRA staff members prefer to receive requests for information at 800-346-9140. ATTRA maintains a web site at [www.attra.org](http://www.attra.org).

*The Grassroots Grazing Group (GGG)* is a network of livestock producers mainly from



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northwest Arkansas but includes producers from many other states including Virginia, Missouri, and Oklahoma. GGG maintains a electronic mailing list on which members routinely share information and opinions regarding various topics on forage management and livestock production. Members meet monthly, usually at a member's farm, to see and discuss information related to grazing practices. Individuals interested in joining the GGG should contact Ann Wells at [annw@ncatark.uark.edu](mailto:annw@ncatark.uark.edu).

*The Center for Advancement of American Black Walnut* is a non-profit organization promoting the planting of an improved variety of eastern black walnut for nut production. For more information contact the Center's Director, Jim Jones, at P. O. Box 600, Stockton, MO 65785, 417-276-6010 (voice), 417-276-6011 (fax), or [jonesctr@hotmail.com](mailto:jonesctr@hotmail.com) (e-mail).

Information regarding the *Arkansas Cooperative Extension Service and the Division of Agriculture* can be found on the internet at the following web site: [www.uaex.edu](http://www.uaex.edu).

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## Attention

Are you interested in a person to speak at a meeting of your civic or agricultural group? If so, please contact David Brauer at 479-675-3834 to see if we can match your interests/needs to the expertise of the Center's staff.

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If you did not receive this newsletter by mail and would like to do so, please contact the Center and we will place you on our mailing list.

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## Upcoming Events

- December 12-13, Arkansas Goat Producer's Association Annual Meeting, 4-H Center, Ferndale, AR. For information contact Debi O'Hearn, [boschmom@flash.net](mailto:boschmom@flash.net).

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